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Morphological and functional attributes of preferred urban public spaces in Alicante province

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Abstract. *Understanding the role of urban public spaces in today's historic Spanish Mediterranean cities is a key issue for researchers and urban professionals. Increasingly, social media showcases users' preferences, a trend that can provide an indication as to why some urban public spaces are preferred over others. This research focuses on the study of morphological and functional attributes of preferred urban public spaces in historic cities of the Province of Alicante (Spain). Two main objectives are pursued: to describe urban morphological features of preferred plazas within the city; and, to identify functional patterns taking into account building uses and activities found in these public spaces. Eight plazas, selected from a previous study using Foursquare social media data, were used as a case study. The research methodology involved the spatial definition of the plaza followed by an analysis of each plaza's morphological and functional attributes. The results demonstrate that the preferred urban spaces have in common more functional than morphological characteristics: good accessibility; ground floor activities; and presence of landmark buildings.*

Keywords: Public space; plaza; livable spaces; social spaces; social networks

Introduction

The analysis of urban public spaces has traditionally been an important concern in the various disciplines related to Urban Studies. The recent application of new technologies as tools to monitor cities' activities offers a wide range of innovative approaches to urban analysis.

This research takes as a case study the most socially relevant plazas of historic cities in the Province of Alicante. The eight plazas analysed in this paper were selected under the assumption that data from location based social networks showcase urban preferences about public spaces in cities (Martí, Serrano-Estrada, & Nolasco-Cirugeda, 2017). Even though the methodology used for the selection of the eight plazas is broadly explained in the paper "Using locative social media and urban cartographies to identify and locate successful urban plazas" (Martí et al., 2017), some of the highlights related to the selection of cities and plazas will be noted hereafter.

First, a population growth criterion was used to determine which of the 141 municipalities in the Province of Alicante could be considered both presently significant in size and historically relevant. In total, eight cities in the Province of Alicante, namely: Alicante, Torrevieja, Elda, Orihuela, Benidorm, San Vicente del Raspeig and Elche were selected.

Second, data from each of the above listed cities were retrieved from the location-based social network Foursquare. The data collected were basically a list of preferred urban spaces, registered as venues in the Foursquare's web service. Also, data included the total of individuals that have visited each venue and registered their presence —or checked-in—. Then, a ranking list of the cities' best ranked urban plazas was obtained and the venue

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occupying the first position was taken for each city —. Once the most relevant urban public plazas were identified, their spatial relationship to the city structure was studied —Table 1—.

From the study of the plazas' location in relation to the city structure, two circumstances should be mentioned. First, all plazas are strongly connected to main structural urban axes and, second, almost all plazas are urban open spaces located either within or in close proximity to the historic centre.

On the basis of the aforementioned observations, the present study may be regarded as an attempt to continue and extend the previously cited work. More specifically, this paper aims to recognize common morphological and functional characteristics among socially successful urban spaces in the Province of Alicante. The hypothesis is that the liveliness and social character of an urban plaza largely depend on its physical and functional configuration.

Methodology

The research methodology consisted of two stages: determining the extent of what is considered plaza space; and analyzing the morphological and functional attributes of the plazas. The morphological attributes were defined as: the overall shape, dimensions and proportions of each plaza; and the area of the façade in relation to the dimensions of the plaza. The functional attributes of the plazas were analyzed and compared in terms of surrounding building uses as well as other elements of the plaza.

a. The spatial definition of the plaza

A precise definition of the space itself was required. A digital reconstruction and dimensioning of the plazas was necessary. For this purpose, four main sources of information were used: the Valencian Community's cadaster electronic office —Portal de la Dirección General del Catastro (Dirección General del Catastro & Ministerio de Hacienda y Administraciones Públicas, 2015)—; Terrasit (Terrasit, 2017); and PNOA's orthophotos (Instituto Geográfico Nacional & Ministerio de Fomento, 2015). Onsite observation and other images were used to compare the various information sources referred to above and obtain the most accurate definition of the space. In terms of the actual limits of the plaza space, a physical, rather than a perceptual, approach was taken. For the purpose of this research, façade walls or any continuous vertical barrier at eye level —normally located at the lot frontage— were considered as the spatial limit of the plazas. This approach responds to the fact that not all plazas are surrounded by buildings tall enough or in close proximity to each other to be viewed and perceived as a continuous enclosure wall for the space.

In order to study the morphological attributes of the plazas, their shape was simplified into a polygon form based façade edges in Figure 1. The polygons were drawn by tracing over the façade edges in Figure 1 and extending them until they intersected an adjacent or perpendicular façade edge. This resulted in the simplified polygon forms represented in Figure 2, which excluded only the plaza access points as they were not considered to be strictly plaza space. The plazas polygons include open areas and covered walkways within the defined limits.

Once the plaza space of all case studies has been delimited, two analyses were performed:

b1. Morphological attributes of the plaza

The enclosed character is the main requirement of a plaza space (Sitte, LeGates, & Stout, 2000). This was a key factor in the analysis of the morphological attributes of the plazas in this case study. The three morphological aspects studied and compared between the eight selected plazas were: the space's horizontal and vertical plane dimensions and proportion. Thus, a quantitative analysis was performed in order to study the dimension and proportion of the selected plazas. For that purpose, the surface area and building heights of each space were calculated to find the relation between the morphological attributes of the eight socially relevant public spaces.

It is important to take into account that the human eye is able to collect an extensive range of information within a radius of approximately 100 meters (Hall, 1973). This reference point is

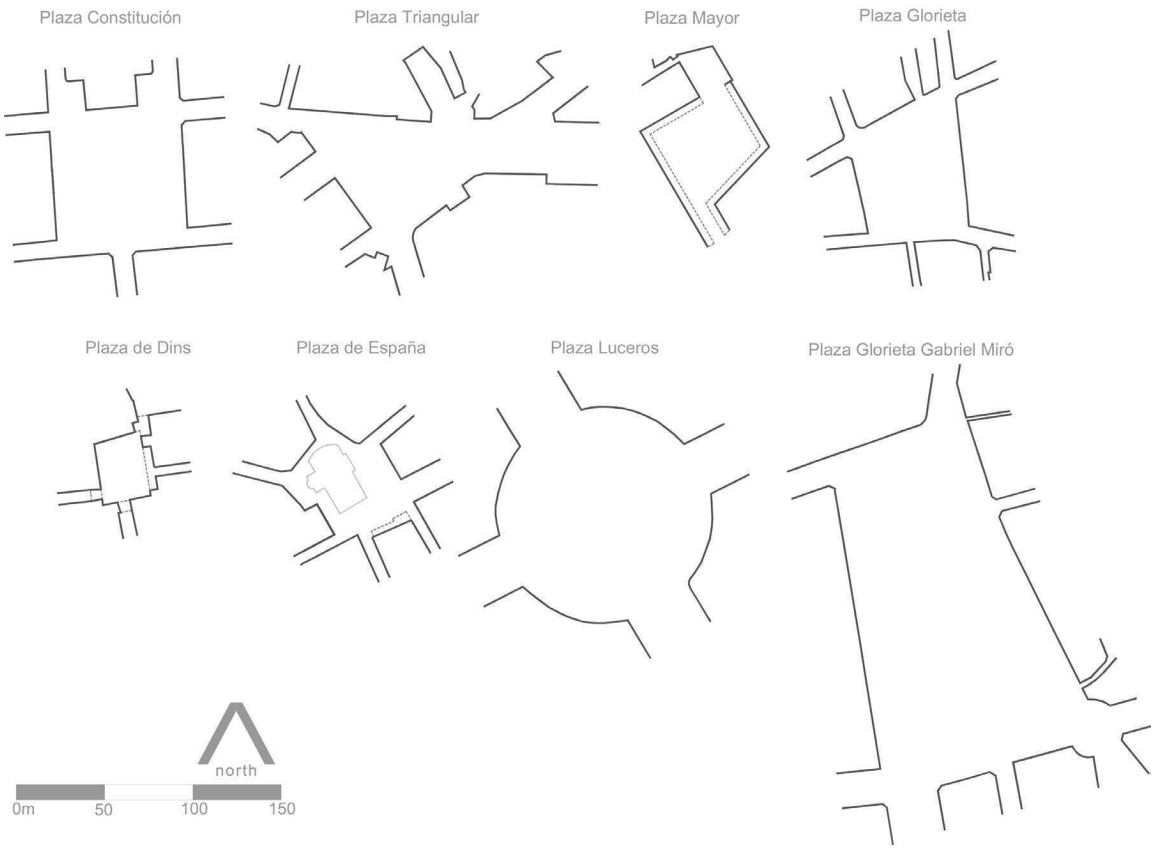

Figure 1.
Façade Edges —continuous vertical barrier at eye level—. Source: authors.

supported by Gehl (2010:71) who, after having studied different public spaces around Europe, recommends that the length of a plaza should not exceed 100 meters.

As for the plazas analysed in this case study, the horizontal plane dimensions were calculated as follows. Two perpendicular axes were drawn, crossing the centre of the polygon from the shortest and longest points at opposite edges of the plaza area representing the horizontal plane of the space. Both lines are taken to represent the width and the length of the polygon.

The plazas' surrounding building heights —vertical plane— and their relation to the plaza space —horizontal plane— were then calculated. With respect to the building heights, it was necessary to obtain the height of each separate building —Figure 3—, and then calculate the average building height of each plaza —Table 2—.

In order to calculate the proportion of each plaza space, the height from the highest and the shortest buildings surrounding the space was considered for the operation of maximum and minimum ratio respectively. This value was then divided by the distance of the perpendicular horizontal line that starts from these buildings —shortest and tallest— to the opposite edge of the polygon. As for the average ratio, it is obtained calculating the average between the two lines that define the horizontal plane —long and short intersecting lines in polygons— divided by the average height of the plazas.

b2. Functional attributes of the plazas

For the purpose of this study, the functional attributes of the plazas are represented by building uses as well as other elements of the plaza space. More specifically, the diversity of building uses affecting the plaza space will be assessed. This responds to the claim that the more active the plaza facade edges, the greater the likelihood of social activities in the space (Gehl, 2010). Thus, since this study is concerned with the most socially relevant

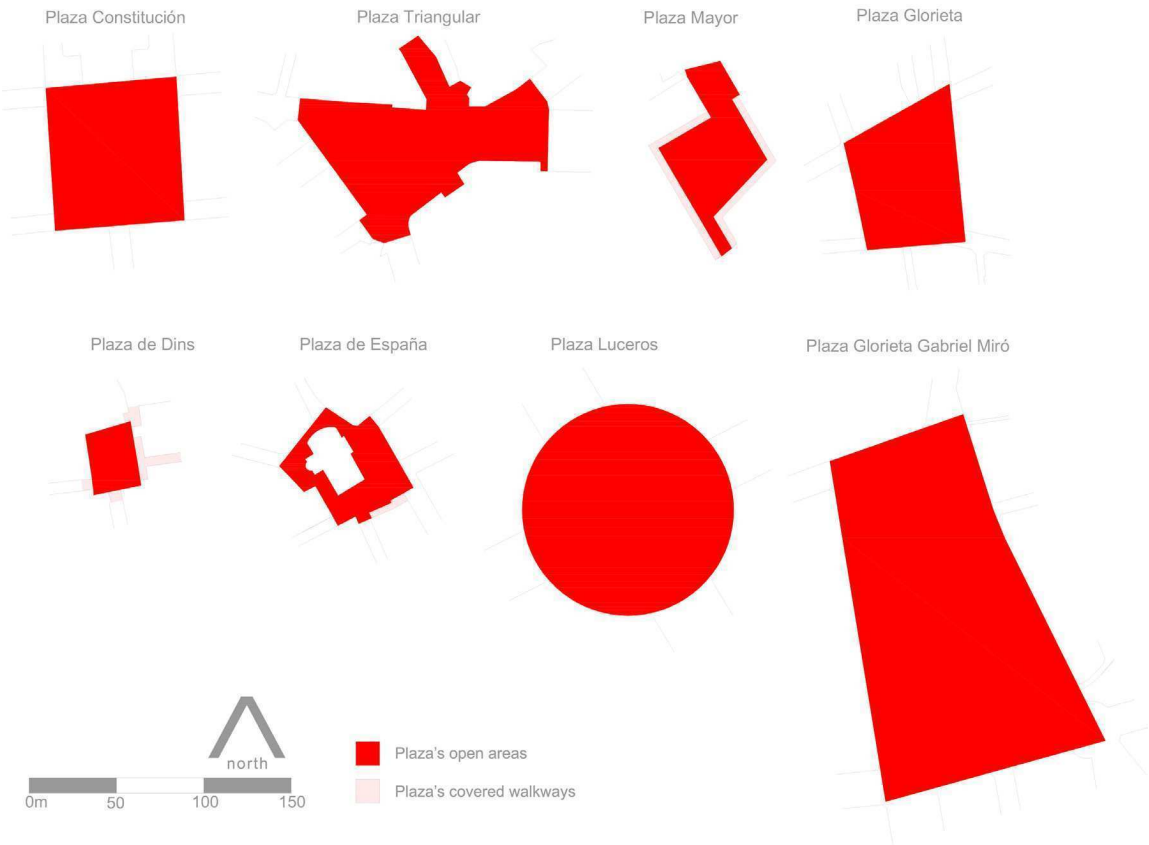

Figure 2.
Plazas' simplified polygon forms. Source: authors.

plazas of Alicante Province, the functional attributes of the space are a key component of their design and livability.

Landmark building uses and other economic activities, capable of reaching a community beyond that of the neighbourhood —religious, governmental buildings, etc.— are worth differentiating from other local economic activities as they might be potential contributors to the social and economic life of the urban area in which they are located. For that purpose, building uses and other elements affecting directly the plaza space are registered and compared. Special attention was given to the impact these may have on the liveliness and social life of the urban environment. Therefore, not only the kinds of economic activities but their availability —opening times— will be considered in the overall discussion relating to the functional attributes of the selected plazas.

Results

a. Spatial definition

The spatial definition of the plazas involved the recognition of the space's façade edges followed by the determination of the polygon area limits. These tasks were complex because the shape and proportion as well as the size of and the angle at which the streets open onto the plazas varied significantly.

b1. Morphological attributes:

Different shapes among the plaza polygons have been recognized. Five of them could be regarded as quadrilateral, one circular and two irregular. With respect to the shape of the polygons, two singular cases are worth noting. First, the polygon of Plaza Triangular in

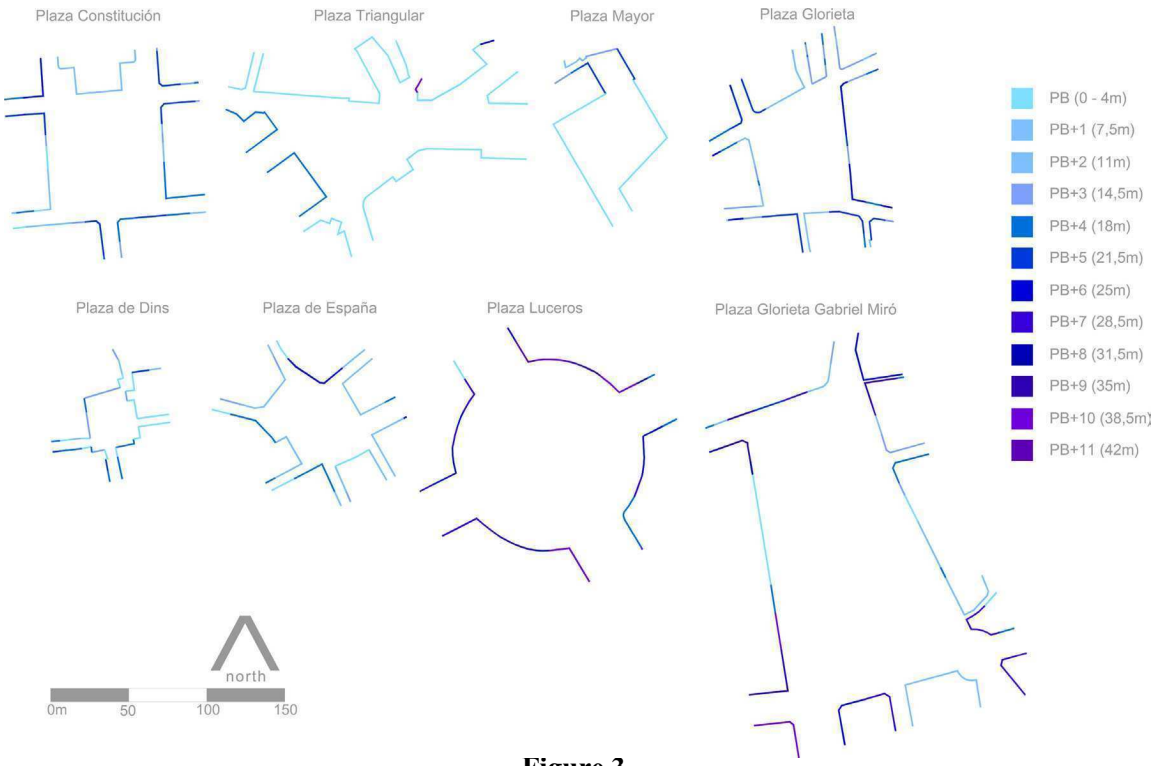

Figure 3.
Plaza's surrounding building heights. Source: Authors.

Benidorm is the most complex of the eight cases studied due to the surrounding buildings' irregular alignment, façade setbacks and varied lot occupation. Second, in the case of Plaza España, in San Vicente del Raspeig, it was decided to include the religious building —San Vicente Ferrer church—in the polygon. The building occupies a great amount of plaza space thereby impeding the visual continuity of the surrounding open space. Thus, the portion of Plaza España next to the rear façade of the church is perceived as disconnected from the rest of the space. However, the final polygon shape of the plaza includes the public spaces surrounding the church in order to consider the morphology and the social character of the plaza space. Firstly, regarding the morphology, unlike Plaza Triangular, most buildings facing Plaza España have a regular morphology and a continuous façade alignment which conveys a sense of enclosure. Secondly, regarding the social character of the space, namely building openings—windows, store fronts and entrances to residential and commercial uses on main floors— are an important part of the Plaza's social life and offer resident self-surveillance opportunities. Furthermore, the plaza space, contiguous to the church's front and side access, is mostly pedestrian and provides opportunities for sitting, leaning and staying —urban elements such as benches, building ledges, bicycle racks, etc.—; all of which promotes people presence and socialization in the space.

Dimension and proportion of the space

With respect to the size of the plazas —Table 3—, the Glorieta Gabirel Miró in Orihuela is the largest plaza studied. It exceeds Plaza Luceros— the second largest plaza— by 10,000 square meters. In contrast, the smallest plazas are plaza de Dins in Alcoy and plaza de España in San Vicente del Raspeig measuring 1300 square meters and 2200 square meters respectively. The rest of the plazas analysed measure around 3500 and 7500 square meters. These figures support Gehl's theoretical claim in relation to the dimensions of European plazas for two reasons. Firstly, six out of the eight plazas analysed do not exceed 10000 square meters; and, secondly, the typical size of European plazas ranges from 6000 to 8000 square meters (Gehl, 2010: 38).

As for the calculation of the horizontal dimensions of the space, plaza Luceros, plaza Glorieta Gabriel Miró y plaza Triangular exceed Gehl's 100-meter reference point on their longer side. In contrast, the smallest plaza —plaza de Dins in Alcoy—, is 35 meters long at the plaza's longest side. The rest of plazas —Glorieta, Constitución, España and Mayor— have dimensions ranging from 60 to 80 meters at their longest side.

Hence, the width ratio of the polygons considering the lengths of the perpendicular lines —horizontal dimension— for the plazas in Alicante, Elche, Torrevieja, Alcoy, San Vicente and Elda are approximately 1:1; and, Orihuela and Benidorm are exceptions with a ratio of 1:2 and 1:3, respectively —Table 3—.

With regards to the building heights, Table 2 shows that Plaza Mayor in Elda, Plaza Triangular in Benidorm, Plaza España in San Vicente del Raspeig and Plaza de Dins in Alcoy have an average height ranging 6 to 12 m.; Plaza Glorieta in Elche and Plaza Constitución in Torrevieja have a height ranging 15 to 20 m. and Plaza Glorieta Gabriel Miró in Orihuela and Plaza Luceros in Alicante possess the highest average building height with 20.6 m and 28.8 m respectively.

With respect to the spatial proportion of the plazas —Table 2—, three cases should be highlighted considering the minimum ratio. Plaza Triangular in Benidorm, Plaza Constitución in Torrevieja and Plaza Glorieta Gabriel Miró in Orihuela, with a minimum height ratio value of 1:17, 1:19 and 1:24 respectively, characerized by the presence of some quite low buildings in relation to the horizontal plane of the plaza. Whereas, the maximum height ratio of most of the plazas does not surpass the 1:3 value. The average height ratio of Plaza Triangular in Benidorm is worth highlighting. The 1:12 value responds to the fact that the vertical plane of the plaza is small in relation to the horizontal plane.

b2. Functional attributes

In terms of the quantity and diversity of building uses and economic activities, there are two casuistries: Four plazas —Plaza Glorieta in Elche, Plaza Triangular in Benidorm, Plaza Luceros in Alicante and Plaza Mayor in Elda— have a good quantity and diversity of main floor building uses. By comparison, plaza Constitución in Torrevieja, Plaza Glorieta Gabirel Miró in Orihuela, Plaza de Dins in Alcoy and Plaza España in San Vicente del Raspeig, are the four plazas with fewer economic activities on the building's ground floor, predominantly occupied by restaurants and bars.

In all cases, the uses of the buildings surrounding the plazas have an impact at city scale mainly due to one or both of the following scenarios —as shown in Table 4—: a) the plazas possess commercial and restaurant services attractive at a city scale level—, like Mc Donald's restaurant in Plaza Triangular in Benidorm; b) they are landmarks —religious, administrative, cultural, or heritage, etc. Moreover, franchise-style retail stores were found in the plazas Glorieta in Elche, Luceros in Alicante and franchise-style restaurants were found in the plazas Triangular in Benidorm, and Luceros in Alicante.

Five of the eight plazas studied possess landmark buildings; also, Plaza Glorieta in Elche, Plaza Constitución in Torrevieja, Plaza Triangular in Benidorm, Plaza Luceros and Plaza Glorieta Gabriel Miró have both monuments and ornamental structures and greenery. Plaza de España in San Vicente del Raspeig has trees and planters and Plaza de Dins in Alcoy and Plaza Mayor in Elda have a scarce amount of greenery.

Discussion and conclusion

The results derived from the analysis of the most socially relevant plazas in the Province of Alicante open a twofold discussion around not only the complexity of delimiting the urban space but also the insights derived from the morphological and functional study.

As for the spatial definition of each plaza, the adopted criterion has evidenced the difficulties involved in delimiting such urban space due to the morphological diversity of the surrounding buildings: the form in plan view; the area of the portico and covered walkways; the characteristics of the facade edges; the height of surrounding buildings; and the existence of isolated buildings.

The perception of an urban space is not the same when the spatial boundaries are clearly defined by continuous building façades alignment or isolated buildings. Examples of these two different perceptual situations are the cases of Alcoi and Benidorm. While in plaza de Dins —Alcoy– a row of façades defines the vertical plane of the square, in plaza Triangular –Benidorm– open spaces, greenery and isolated building blocks give the impression of an unenclosed space.

In terms of morphological insights, it is also worthwhile noting that the plazas analysed in this case study do not follow the model —100x70m— of typical European historic cities observed by Gehl (2010, p. 38). The study of the urban dimensions of the selected plazas allowed an identification of the relationship between the horizontal plane and the vertical plane. In some cases, although the ratios were similar, for example, in the case of the Plaza Glorieta Gabriel Miró —Orihuela— and the Plaza Mayor —Elda—, the perception of both urban spaces is very different. Glorieta Gabriel Miró, the largest plaza, surrounded by a continuous row of façades, is perceived as an unenclosed space because the delimiting vertical plane is not high enough and is hidden behind the greenery. Plaza Mayor is perceived as an enclosed space, with an unobstructed view of the vertical plane that delimits the plaza. Altogether, the most socially relevant plazas of the province of Alicante possess a variety of morphological attributes, not necessarily complying to theoretical standards.

The findings related to functional issues indicate that the quantity and diversity of economic and leisure activities are two of the most important factors that influence social activity in urban public spaces. Moreover, if economic and leisure activities are diverse and available continuously, social interaction at different times of the day is encouraged. The cases of plaza Triangular—Benidorm— and plaza Glorieta Gabriel Miró —Orihuela— are two examples worth noting. They both have offices —with early opening hours—, shops —with morning and evening opening hours—; restaurants and bars —with activity until dawn—; and a casino —with extensive opening hours from 10am to 5am—.

Ultimately, the functional analysis showed that the plaza's edge, as an independent entity, plays a fundamental role in the social activities that take place in the plaza and, therefore, may alter the perception of a space. The plaza's permeability, transparency and visual content are decisive elements for the social life of a public space. Specifically, restaurant and bar terraces in the plazas of the province of Alicante are an activity booster.

Finally, this research has demonstrated that the eight most socially relevant plazas of the province of Alicante share more functional than morphological aspects. The connection between the plaza's social relevance and its location, accessibility (Martí et al., 2017) and sense of enclosure (Sitte et al., 2000) have been well documented in the scientific literature. However, this research has established that the social relevance of a plaza is also determined— at least in so far as the cases studied— by the presence of landmark buildings and/or city-scale impact establishments.

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Appendix

Table 1. Selection of relevant historic cities in the province of Alicante and identification of preferred public spaces (Martí et al., 2017).

Historic Cities of the Province of Alicante	**Most socially relevant plaza according to Foursquare's cumulative number of visitors (up to 2 Feb 2016)**	**Location in relation to the historic city centre as defined by the bibliographic references**
Alicante	Plaza Luceros	-
Elche	Plaza Glorieta	within
San Vicente del Raspeig	Plaza de España	within
Benidorm	Plaza Triangular	In close proximity
Alcoy	Plaza de Dins	within
Torrevieja	Plaza de la Constitución	within
Elda	Plaza Mayor	In close proximity
Orihuela	Plaza Glorieta Gabriel Miró	In close proximity

Table 2. Average building heights and space's height ratios considering the vertical and horizontal planes.

	Average height of the plazas (m) —vertical plane—	**Maximum ratio**	**Minimum ratio**	**Average ratio**
Plaza Glorieta, Elche	17.4	1:3	1:7	1:4
Plaza de Dins, Alcoy	11.8	1:2	1:7	1:3
Plaza España, San Vicente del Raspeig	10.3	1:2	1:5	1:5
Plaza Constitución, Torrevieja	15.3	1:3	1:24	1:7
Plaza Triangular, Benidorm	6.9	1:2	1:17	1:12
Plaza Mayor, Elda	8.3	1:1	1:4	1:7
Plaza Luceros, Alicante	28.8	1:3	1:7	1:4
Plaza Glorieta Gabriel Miró, Orihuela	20.6	1:3	1:24	1:7

Table 3. Total area of plazas and width ratio of the polygons.

	Total area of the plazas (m2)	**Width ratio of the polygons —horizontal plane—**
Plaza Glorieta, Elche	4.644	1:1
Plaza de Dins, Alcoy	1.359	1:1
Plaza España, San Vicente del Raspeig	2.250	1:1
Plaza Constitución, Torrevieja	6.139	1:1
Plaza Triangular, Benidorm	7.591	1:3
Plaza Mayor, Elda	3.853	1:1
Plaza Luceros, Alicante	11.543	1:1
Plaza Glorieta Gabriel Miró, Orihuela	20.382	1:2

Table 4. Functional characteristics of the plazas.

	SURROUNDING BUILDINGS		ELEMENTS OF THE PLAZA	
	Landmark buildings (religious, administrative heritage buildings)	**Commercial uses and restaurant services (L= local or C=city scale)**	**Greenery**	**Monuments and ornamental structures**
Plaza Glorieta, Elche	Heritage	L, C	Trees, flowerbeds	Ornamental fountain, Sculptural element
Plaza de Dins, Alcoy	Heritage, administrative	L	Planters	Local art and craft display
Plaza España, San Vicente del Raspeig	Administrative, religious	L	Trees, planters	Ornamental fountain
Plaza Constitución, Torrevieja	Administrative, religious	L	Trees, flowerbeds	Ornamental fountain
Plaza Triangular, Benidorm	-	L, C	Trees, flowerbeds	Sculptural elements
Plaza Mayor, Elda	-	L	Planters	Ornamental fountain
Plaza Luceros, Alicante	-	L, C	Trees, flowerbeds	Ornamental fountain
Plaza Glorieta Gabriel Miró, Orihuela	Religious	L	Trees, flowerbeds	Ornamental fountains and Ornamental gazebo